

CAECIDOTEA DAUPHINA, A NEW SUBTERRANEAN
ISOPOD FROM A BARRIER ISLAND IN THE
NORTHERN GULF OF MEXICO
(CRUSTACEA: ISOPODA: ASELLIDAE)

Richard F. Modlin

Abstract.—*Caecidotea dauphina*, a phreatobitic asellid of the Hobbsi group, is described and identified. Its type habitat is located on a sandy barrier island in the Gulf of Mexico off the coast of Alabama.

Records of subterranean isopods of Alabama are limited to four. *Caecidotea alabamensis* was reported originally from a well located in the Piedmont of east-central Alabama (Stafford 1911), while *C. bicrenata* (Steeves 1963) and *C. meisterae* (Lewis and Bowman 1981; Modlin, unpublished record) were collected in caves in the northern Appalachian region. Steeves (1964) synonymized *C. bicrenata* with *C. alabamensis*, but Lewis and Bowman (1981) reinstated its species status. The species list of Fleming (1972) includes *C. richardsonae* in addition to *C. alabamensis* from locations in Alabama. Morphologically, all four species align with Steeves' Stygius group (Steeves 1963, 1966). Herein is the description of a new species of the Hobbsi group collected on Dauphin Island, Mobile County, Alabama, a sandy barrier island in the southernmost part of the state.

Caecidotea dauphina, new species
Figs. 1-4

Material examined.—Alabama, Mobile County, Dauphin Island, Audubon Sanctuary, 9 Aug 1984, R. F. Modlin, 1 male (7.5 mm) holotype, partly dissected on 5 slides and in alcohol (USNM 227076); 8 females (3.3-4.5 mm) and 1 juvenile (2.4 mm) paratypes, in alcohol (USNM 227077). 27 Aug 1984, R. F. Modlin, 1 female (4.2 mm), dissected on 7 slides, in author's col-

lection (082784F22); same locality. Type-specimens are deposited in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

Diagnosis.—Blind, unpigmented. Antenna 1 esthete formula 0-1-0. Male pereopod 1 palm defined by robust proximal spine, small triangular mesial process, and truncate distal process. Male pleopod 1 longer than pleopod 2, protopod with 6 retinacula. Endopodial tip of male pleopod 2 with short straight cannula, triangular mesial process with tip curved medially, and truncate lateral process.

Description.—Lateral sides of body slightly concave, narrowest at pereonites 3 and 4. Average width of 7.5 mm male is 1.6 mm. Head about $0.6 \times$ wider than long; anterior margin concave. Telson about $0.8 \times$ longer than wide; lateral margins parallel, posterior margin with distinct caudomedial lobe.

Antenna 1 reaching to about midlength of last segment of antenna 2 peduncle. Flaggellum composed of 10 segments, esthete formula 0-1-0. Single esthete located on segment 9. Antenna 2 flagellum about $2.5 \times$ length of peduncle, reaching to about 6th pereonite.

Mandible with 4-cusped incisors and lacinia, spine-row with 8 and 10 spines respectively on right and left. Medial spine row on segment 3 of mandibular palp in-

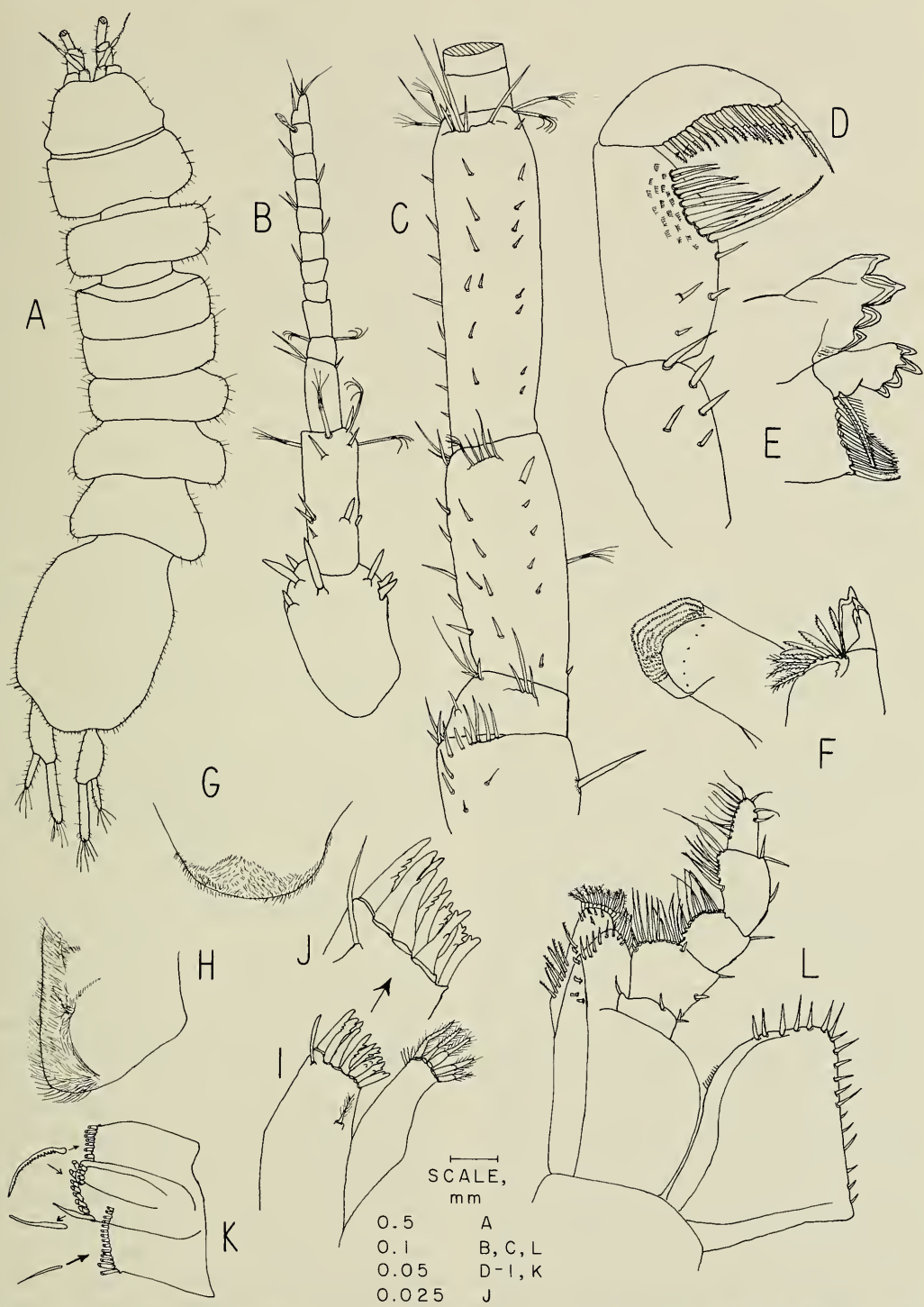


Fig. 1. *Caecidotea dauphina*, A-E, L = 7.5 mm male holotype; F-K = 4.2 mm female: A, Habitus, dorsal; B, Antenna 1; C, Antenna 2, peduncle; D, Mandibular palp; E, Left mandible; F, Right mandible; G, Labrum; H, Left labium; I, Maxilla 1; J, Maxilla 1 outer lobe; K, Maxilla 2; L, Maxilliped.

creasing slightly in length distally, 2 distal-most spines about $2.5 \times$ longer than others; distal row of spines on segment 2 strongly increasing in length proximally, minute setae arranged in linear clumps located lateral to spine row. Maxilla 1 inner lobe with 5 apical plumose setae; outer lobe with 13 apical robust spines (not all spines shown in Fig. 11, J) and 2 subapical setae, one simple and one plumose. Maxilliped with 5 retinacula in male and 3–4 in females.

Male pereopod 1 propodus about $0.9 \times$ as wide as long; palm defined by robust proximal articulated spine, triangular mesial process separated from lower truncate distal process by shallow cleft, distal process about twice as wide as mesial process; carpus with 3 robust articulated spines and 3 slender simple setae on anterodistal margin. Female pereopod 1 propodus about $1.6 \times$ as wide as long; palm defined by robust proximal articulated spine, without mesial and distal processes; carpus with 1 robust and 2 smaller articulated spines and 1 long simple seta on anterodistal margin. Sexual dimorphism in pereopods 2–7 exhibited only by fewer spines on female pereopods.

Male pleopod 1 longer than pleopod 2, protopod with 6 retinacula; endopod about $0.4 \times$ as long as wide, medial and distal margins convex, lateral margin slightly concave in distal half, distal margin with 4 long plumose setae and 5 shorter simple setae, lateral margin with 8–10 very small simple setae in distal half and about 5 simple setae of moderate length in proximal half, about 5 small setae subterminal to distal margin.

Male pleopod 2 protopod with 3 simple setae on medial margin; exopod basal segment triangular with 3 short simple setae on lateral edge, distal segment oval, about $0.8 \times$ as long as wide, with 14 plumose marginal setae; endopod with rounded lateral basal apophysis, distal end of lateral margin weakly striated, tip with 4 processes: 1) canula straight, subapical, slightly directed medially, partly obscured in anterior view by mesial process, but completely visible in posterior view; 2) mesial process with apex

rising above other processes, apex twisted strongly in medial direction, proximal $\frac{2}{3}$ of medial edge with many striae, lateral edge almost straight forming medial edge of endopodial groove; 3) lateral process rectangular, height about $0.7 \times$ distance from base of endopodial groove to tip of the mesial process, apex truncate, lateral edge dropping straight to small shelf; 4) caudal process low, rounded, traversing entire tip of endopod. Female pleopod 2 with 7 plumose marginal setae. Male pleopod 3 exopod with about 20 long plumose setae along and around distal margin, short plumose setae interspersed with simple setae along distal $\frac{2}{3}$ of lateral margin, short simple setae line lateral margin proximal to suture, many short simple setae on anterior surface. Pleopod 4 exopod with about 5 long plumose setae near lateral edge of distal margin, many minute setae interspersed with long simple setae on proximal $\frac{1}{3}$ of lateral margin, false suture pattern A with transverse suture terminating on lateral margin just below mid-length. Pleopod 5 with 2 false sutures and 5 simple setae on lateral margin proximally. Uropods spatulate, about $0.6 \times$ length of telson, endopods $1.7 \times$ longer than exopods.

Etymology.—This species' name refers to Dauphin Island, Alabama on which the specimens were collected.

Habitat.—The type habitat of *C. dauphina* is located in the Audubon Sanctuary on Dauphin Island, Mobile County, Alabama ($30^{\circ}15'N$, $88^{\circ}05'W$) (Fig. 5). Specimens were collected in a depression located about 1–2 m from the outfall of a tile drain pipe that crosses under a service road. This depression is on the periphery of a black gum, *Nyssa sylvatica*, swamp and it is periodically dry. The swamp is a remnant of the once expansive Alligator Swamp system that covered much of the eastern part of Dauphin Island. Consequently, the sanctuary and contiguous areas contain several artesian wells that become active during the rainy season (McNeely 1974). Specimens were collected in the company of the epigeal isopod *C. obtusus* several days after a

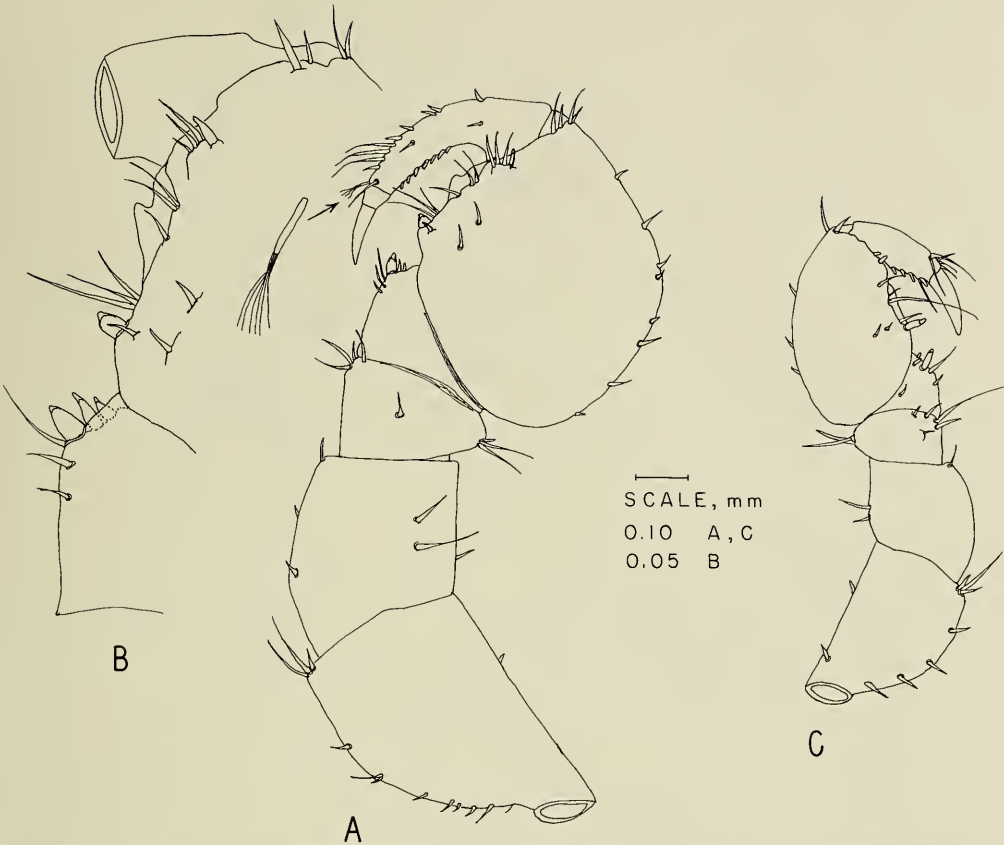


Fig. 2. *Caecidotea dauphina*, Pereopod 1: A, 7.5 mm male holotype, structure of multiflagellated spine enlarged; B, detail of palmar margin of propodus and anterior margin of carpus; C, 4.2 mm female.

major rain storm. *Caecidotea dauphina* was probably flushed from the tiles by the increased water flow.

Some physical and chemical data were collected to characterize the habitat; water temperature ranged from 25–26°C, pH 5.3–5.6 and conductivity 236–360 μ Mhos at 25°C.

Interestingly, the type habitat is about 500 m from the saline water of the Gulf of Mexico and on an island whose last surface land connection to the mainland occurred during the Pleistocene (Price 1954).

Relationships.—*Caecidotea dauphina* shows affinity to the Hobbsi group because it has all the morphological characteristics that define this group (Steeves 1964; Lewis 1982). An evolutionary link may exist between *C. dauphina* and *C. tridentata*, *C.*

spatulata, *C. teresae*, and *C. parvus*. All these species have a mesial process on the tip end of the endopod of male pleopod 2 that curves, to varying degrees, medially. Setal structure and arrangement on the distal margin of the exopod of male pleopod 1, endopod of male pleopod 2 and margins of the female pleopod 2 suggest that *C. dauphina* has more in common with *C. teresae* than with the others. However, the geographic ranges of *C. teresae*, *C. tridentata* and *C. spatulata* are in close proximity and may overlap, but they are greatly separated from that of *C. dauphina*. The former three are known from the midwestern United States (Lewis and Bowman 1981; Lewis 1982), while *C. dauphina* is located in the coastal region of Alabama, slightly west of the Hobbsi geographic range originally pro-

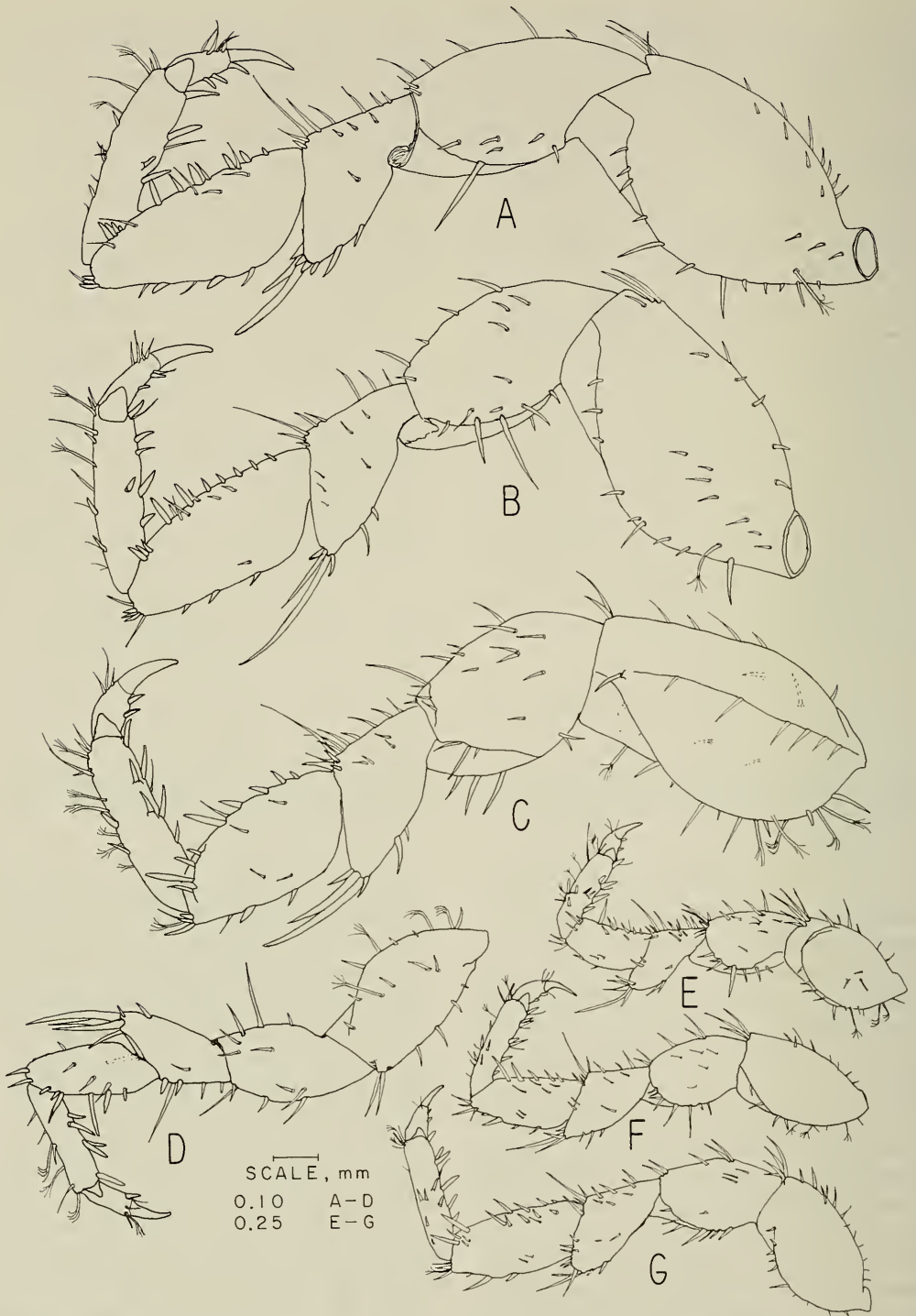


Fig. 3. *Caecidotea dauphina*, A-C, E-G = 7.5 mm male holotype; D, 4.2 mm female: A-C, Pereopods 2-4; D, Pereopod 4; E-G, Pereopods 5-7.

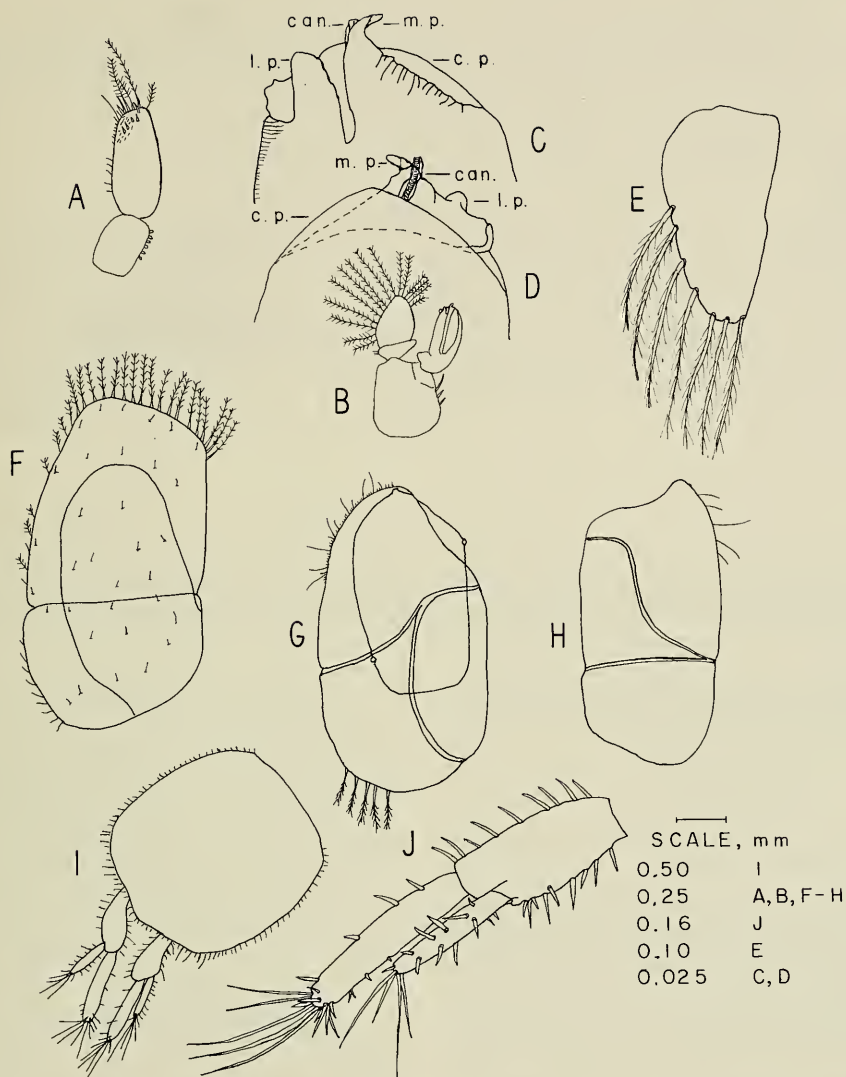


Fig. 4. *Caecidotea dauphina*, A-D, F-J = 7.5 mm male holotype; E = 4.2 mm female: A, Pleopod 1; B, Pleopod 2; C and D, Pleopod 2 endopodial tip, ventral and dorsal views, can = cannula, c.p. = caudal process, l.p. = lateral process, m.p. = mesial process; E, Pleopod 2; F, Pleopod 3; G, Pleopod 4; H, Pleopod 5; I, Telson-uropod complex; J, Uropod.

posed by Steeves (1964). The type habitat of *C. dauphina* appears contiguous with that of *C. parvus* which occurs in north central Florida (Steeves 1964). However, *C. parvus* does not belong to the Hobbsi group (Lewis 1982). Its only similarity to *C. dauphina* and the other three species above is the structure of the mesial process on the en-

dopodial tip of the male pleopod 2. Additionally, *C. dauphina* along with *C. teresae*, *C. tridentata*, and *C. spatulata* are phreatobitic and occupy drain tile habitats (Lewis and Bowman 1981; Lewis 1982), while *C. parvus* is a troglobite inhabiting caves (Steeves 1964). Recently *C. parvus* was placed into the new genus *Remasellus* be-

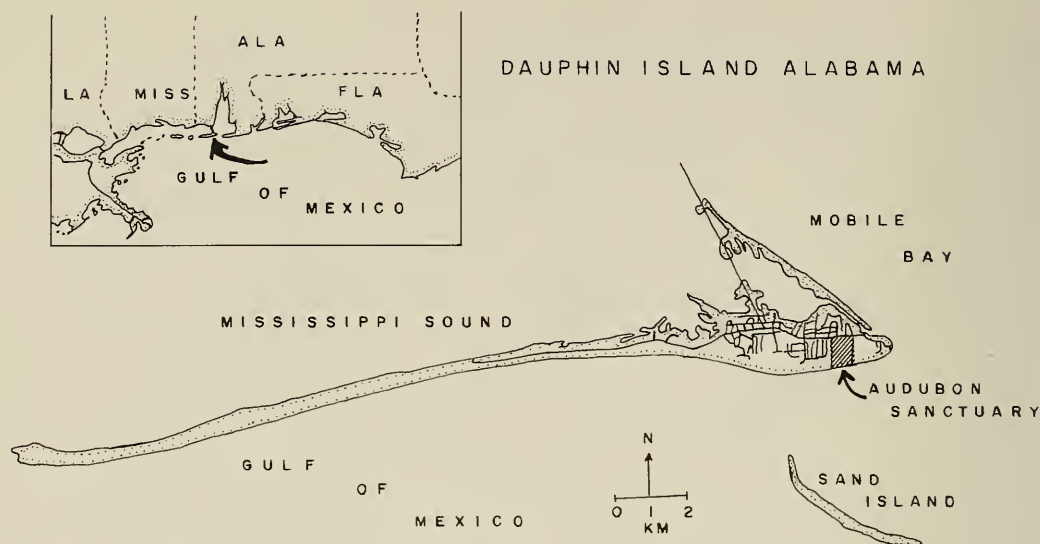


Fig. 5. Dauphin Island, Alabama, showing the Audubon Sanctuary where specimens of *Caecidotea dauphina* were collected. Inset indicates the position of Dauphin Island along the northern coast of the Gulf of Mexico.

cause it was found to be a swimming isopod (Bowman and Sket 1985).

Acknowledgments

I wish to thank Dr. Thomas E. Bowman, USNM, for critically reviewing this manuscript and for providing helpful comments, and the Marine Environmental Sciences Consortium, Dauphin Island Sea Lab, Dauphin Island, Alabama, for providing laboratory space and other facilities during this project. This is M.E.S.C. Contribution #088.

Literature Cited

- Bowman, Thomas E., and Boris Sket. 1985. *Remasellus*, a new genus for the troglobitic swimming Florida asellid isopod, *Asellus parvus* Steeves. — *Proceedings of the Biological Society of Washington* 98(3):554–560.
- Fleming, Laurence E. 1972. The evolution of the eastern North American isopods of the genus *Asellus* (Crustacea: Asellidae) Part I. — *International Journal of Speleology* 4:221–256.
- Lewis, Julian J. 1982. A diagnosis of the Hobbsi group, with descriptions of *Caecidotea teresae*, n. sp., and *C. macropropoda* Chase and Blair (Crustacea: Isopoda: Asellidae). — *Proceedings of the Biological Society of Washington* 95(2): 338–346.
- , and Thomas E. Bowman. 1981. The subterranean asellids (Caecidotea) of Illinois (Crustacea: Isopoda: Asellidae). — *Smithsonian Contributions to Zoology* 355:1–66.
- McNeely, S. B. 1974. The development of Dauphin Island, Alabama. — *The Mobile Area Chamber of Commerce*, 93 pp.
- Price, W. Armstrong. 1954. Shoreline and coasts of the Gulf of Mexico. In Galtsoff, P. S. (ed.), *Geology of the Gulf of Mexico, its origin, waters and marine life*. — U.S. Fish and Wildlife Service, *Fishery Bulletin* 55(89):39–85.
- Stafford, B. E. 1911. A new subterranean freshwater isopod. — *Pomona Journal of Entomology* 3:572–575.
- Steeves, Harrison R., III. 1963. The troglobitic asellids of the United States: The Stygius group. — *American Midland Naturalist* 69(2):470–481.
- . 1964. The troglobitic asellids of the United States: The Hobbsi group. — *American Midland Naturalist* 71(2):445–451.
- . 1966. Evolutionary aspects of the troglobitic asellids of the United States: The Hobbsi, Stygius, and Cannulus groups. — *American Midland Naturalist* 75(2):392–403.

Department of Biological Sciences, University of Alabama in Huntsville, Huntsville, Alabama 35899.